

## CLIMATE

# Predicting Our Future: Climate Models Recognized Around the World

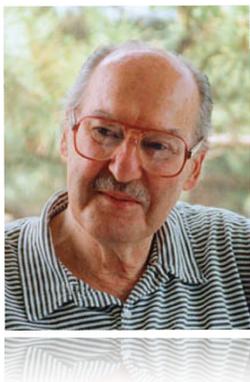
**Impact**  
**World-class climate modeling set a new benchmark for long-term prediction**

One of the most highly-regarded climate models in the world, developed by OAR's Geophysical Fluid Dynamics Laboratory (GFDL), had a prominent role in the Fourth Assessment of the Intergovernmental Panel on Climate Change (IPCC). The GFDL CM2.1 global coupled climate model provides increased credibility for understanding the observed past climate changes and for making future climate change projections.

Climate models are computer-based simulations that use mathematical formulas to recreate the chemical and physical processes that drive Earth's climate. GFDL has produced groundbreaking work in climate modeling since the late 1960s when it released the first-of-its-kind general circulation climate model that combined oceanic and atmospheric processes.

Recently, GFDL scientists have used a "descendant" from the very first climate model to understand the factors driving 20th century climate change, and to simulate the projections of climate changes over the 21st century and beyond that may be induced by increasing atmospheric levels of carbon dioxide.

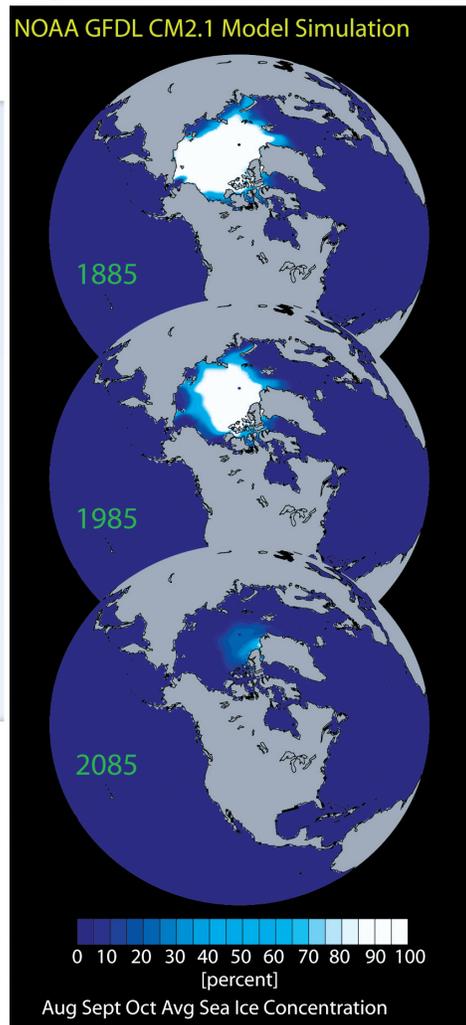
Looking to future climate modeling needs, the model incorporates the next generation in modeling infrastructure, the Flexible Modeling System. The system provides a common platform for diverse research activities, from weather to seasonal prediction to anthropogenic (man-made) climate change.



OAR's Joseph Smagorinsky, GFDL Founding Director (1924 – 2005): visionary in numerical weather prediction and climate modeling

Research is now underway to improve resolution of the model, to increase the realism of the climate processes represented in the model, and to reduce the key uncertainties. Future models enabled by necessary advances in computing will enhance NOAA's ability to simulate regional climate change, as well as abrupt shifts and extremes in climate.

Image: Geophysical Fluid Dynamics Laboratory CM2.1 Model depicts Arctic sea ice changes.



**OAR's GFDL scientists created simulations for more than 5,000 years of past, future and idealized climate standards, setting the bar for climate modeling.**